**Claims**

1. A nitride semiconductor LED, comprising:

a substrate;

a GaN-based buffer layer formed on the substrate;

$Al_yGa_{1-y}N/GaN$ short period superlattice (SPS) layers formed on the GaN-based buffer layer in a sandwich structure of upper and lower layers having an undoped GaN layer or an indium-doped GaN layer interposed therebetween (where, $0 \leq y \leq 1$);

a first electrode layer of an n-GaN layer formed on the upper $Al_yGa_{1-y}N/GaN$ SPS layer;

an active layer formed on the first electrode layer; and

a second electrode layer of a p-GaN layer formed on the active layer.

2. The nitride semiconductor LED of claim 1, wherein the GaN-based buffer layer has a triple-structured $Al_yIn_xGa_{1-x,y}N/In_xGa_{1-x}N/GaN$ laminated (Here, $0 \leq x \leq 1$, $0 \leq y \leq 1$), a double-structured $In_xGa_{1-x}N/GaN$ laminated (Here, $0 \leq x \leq 1$), or a super-lattice-structured (SLS) $In_xGa_{1-x}N/GaN$ laminated (Here, $0 \leq x \leq 1$).

3. The nitride semiconductor LED of claim 1, further comprising the undoped GaN layer or the indium-doped GaN layer on the GaN-based buffer layer.

4. A nitride semiconductor LED, comprising:

a substrate;

a GaN-based buffer layer formed on the substrate;

an undoped GaN layer or an indium-doped GaN layer formed on the GaN-based buffer layer;

$Al_yGa_{1-y}N/GaN$ short period superlattice (SPS) layers formed on the undoped GaN layer or the indium-doped GaN

layer, in a sandwich structure of upper and lower layers having the undoped GaN layer or the indium-doped GaN layer interposed therebetween (Here, $0 \leq y \leq 1$);

a first electrode layer of an $n^+$-GaN layer formed on the upper $Al_yGa_{1-y}N$/GaN SPS layer and containing a high concentration of dopants;

an n-GaN layer formed on the first electrode layer and containing a low concentration of dopants;

an active layer formed on the n-GaN layer; and

a second electrode layer of a p-GaN layer formed on the active layer.

5. The nitride semiconductor LED of claim 4, wherein the GaN-based buffer layer has a triple-structured $Al_yIn_xGa_{1-x,y}N/In_xGa_{1-x}N$/GaN laminated (Here, $0 \leq x \leq 1$, $0 \leq y \leq 1$), a double-structured $In_xGa_{1-x}N$/GaN laminated (Here, $0 \leq x \leq 1$), or a super-lattice-structured (SLS) $In_xGa_{1-x}N$/GaN laminated (Here, $0 \leq x \leq 1$).

6. A nitride semiconductor LED, comprising:

a substrate;

a GaN-based buffer layer formed on the substrate;

a first electrode layer of an $n^+$-GaN layer formed on the GaN-based buffer layer and containing a high concentration of dopants;

an n-GaN layer formed on the first electrode layer and containing a low concentration of dopants;

an active layer formed on the n-GaN layer; and

a second electrode layer of a p-GaN layer formed on the active layer.

7. The nitride semiconductor LED of claim 6, wherein the dopant concentration of the $n^+$-GaN layer is more than $1x10^{18}/cm^3$.

8. The nitride semiconductor LED of claim 6, wherein the dopant concentration of the n-GaN layer is less than $1x10^{18}/cm^3$.

9. The nitride semiconductor LED of claim 6, wherein the dopant concentration of the n-GaN layer is $1x10^{17}/cm^3$.

10. The nitride semiconductor LED of claim 6, wherein the GaN-based buffer layer has a triple-structured $Al_yIn_xGa_{1-x,y}N/In_xGa_{1-x}N/GaN$ laminated (Here, $0\leq x\leq 1$, $0\leq y\leq 1$), a double-structured $In_xGa_{1-x}N/GaN$ laminated (Here, $0\leq x\leq 1$), or a super-lattice-structured (SLS) $In_xGa_{1-x}N/GaN$ laminated (Here, $0\leq x\leq 1$).

11. The nitride semiconductor LED of claim 6, further comprising $Al_yGa_{1-y}N/GaN$ short period superlattice (SPS) layers formed on the GaN-based buffer layer in a sandwich structure of upper and lower parts having an undoped GaN layer or an indium-doped GaN layer interposed therebetween (Here, $0\leq y\leq 1$).

12. A fabrication method of a nitride semiconductor LED, the method comprising the steps of:

growing-up a GaN-based buffer layer on a substrate;

forming $Al_yGa_{1-y}N/GaN$ short period superlattice (SPS) layers on the GaN-based buffer layer in a sandwich structure of upper and lower parts having an undoped GaN layer or an indium-doped GaN layer interposed therebetween (Here, $0\leq y\leq 1$);

forming a first electrode layer of an $n^+$-GaN layer containing a high concentration of dopants, on the upper $Al_yGa_{1-y}N/GaN$ SPS layer;

forming an active layer on the first electrode layer; and

forming a second electrode layer of an p-GaN layer on the active layer.

13. The fabrication method of claim 12, further comprising the step of forming an n-GaN layer containing a low concentration of dopants, between the first electrode layer of the $n^+$-GaN layer and the active layer.

14. The fabrication method of claim 12, wherein the GaN-based buffer layer is, using a MOCVD equipment, grown-up to have a 50-800Å thickness at a 500-800℃ temperature and in an atmosphere having $H_2$ and $N_2$ carrier gases supplied while having TMGa, TMIn, TMAl source gas introduced and simultaneously having $NH_3$ gas introduced.

15. The fabrication method of claim 12, wherein the GaN-based buffer layer is grown-up with a 5-300μmol/min flow rate of the TMGa, TMIn, TMAl source gas and a 100-700torr growth pressure.

16. The fabrication method of claim 12, wherein the GaN-based buffer layer has a triple-structured $Al_yIn_xGa_{1-x,y}N/In_xGa_{1-x}N/GaN$ laminated (Here, $0\leq x\leq 1$, $0\leq y\leq 1$), a double-structured $In_xGa_{1-x}N/GaN$ laminated (Here, $0\leq x\leq 1$), or a super-lattice-structured (SLS) $In_xGa_{1-x}N/GaN$ laminated (Here, $0\leq x\leq 1$).

17. The fabrication method of claim 12, further comprising the step of forming an undoped GaN layer or an indium-doped GaN layer on the GaN-based buffer layer.

18. The fabrication method of claim 12, wherein the dopant concentration of the $n^+$-GaN layer is more than $1x10^{18}/cm^3$.

19. The fabrication method of claim 13, wherein the dopant concentration of the n-GaN layer is $1x10^{17}/cm^3$.

20. The fabrication method of claim 13, wherein the n-GaN layer is formed with a semi-insulating layer.